in each at the end of three or four days. One of his patients (Case II.) left the hospital three days after the ligature of the brachial; another, seventy-nine years old (Case VIII.), got up ten days after the ligature of the femoral.

From the moment that immediate reunion becomes the rule after these operations, the field of surgery is wonderfully enlarged. We shall be able to approach the ligature of the subclavian artery within the scalenus, which until now has always caused death by secondary hemorrhage, as well as that of the primitive iliacus or hypogastric. And as for the ligations which usually succeeded with the old methods, after more or less prolonged suppurations, we can assert that the antiseptic dressing renders them so inoffensive that they are less exhausting to the patient than simple digital compression.

There is no further reason why we should seek for a better agent of deligation than catgut. While it is reabsorbed after a certain number of days, it none the less leaves the artery obliterated; it is a fact that has been verified too often to be any longer disputable. From what substance may we expect superior results? Undoubtedly, silk threads or metallic wires encyst themselves sometimes in the tissues without interfering with primary reunion. But they do not disappear, or, if so, only after long months, and often they cause suppurations which eliminate them even more slowly.

The only admissible objection to the use of catgut is that we do not always have on hand threads of this material which are of good quality. The country doctor and the army surgeon will often be obliged to do without them. Then, they may make use of a silk thread or a linen one boiled in carbolic acid; this thread is easier to prepare, to preserve, and to transport than catgut, and it is more like it, without, however, offering the same assurances for the success of the immediate reunion. But why surgeons, who are converted to the antiseptic method, should still reject catgut for ligatures of arteries in continuity, under pretext that it is not sufficiently resistant, I cannot explain, unless by the instinctive fear caused by its reabsorption. Experience and reasoning have proved equally that this fear is chimerical, and it ought not to prevent us in the future from making use of this valuable agent.

MEDICINE.

Fatty Embolism.

In 1860, H. Müller (*Würzburger Medic. Zeitschrift*) first observed the phenomenon of fatty embolism in man. While examining the eyes of a young man who had died of contracted kidney, he found that some of the choroidal vessels were filled with fat. This fat, to which he did not attach any importance, was supposed by him to have come from atheromatous patches in the aorta or other vessels.

Similar observations as to the presence of fat in the bloodvessels after death were afterwards made by several observers; but it was regarded as a mere curiosity till the appearance of a paper by Wagner in 1862 (*Archiv für Heilkunde*), in which, from the frequent occurrence of fatty emboli in pyæmic cases, and from the result of experiments on lower animals, the opinion was expressed that they were a common cause of pyæmia. The attention of German observers was now directed to this subject, and numerous monographs on fatty embolism have since that time appeared. Of these may be mentioned that of Bergmann, in 1863, who, directing his attention to the effects produced by the introduction of oil into the circulation, attributed the death which resulted in some cases to paralysis of the heart and œdema of the lungs; of Wagner, in 1865, in which an attempt was made to trace the origin of the fat in forty-eight cases of fatty embolism observed by him, fifteen of these being cases of rapid death after severe injuries of the bones and soft parts; of Busch, in 1866, who demonstrated that, immediately after injury to the medulla of a bone, fatty embolism of the pulmonary capillaries occurred, that the fat entered the circulation through the opened veins, and that it never caused abscesses or inflammatory disturbances—that, in fact, fatty embolism was of little importance, being only dangerous when in very large amount; of Cohnheim, in 1872, who clearly pointed out the existence of two kinds of fatty emboli, a non-irritating form which occurs after subcutaneous injuries, and an irritating form, where the fat is derived from the immediate neighbourhood of a septic wound; and of Flournoy, in 1878, who showed, among other things, that the conditions necessary for the occurrence of fatty embolism were, sufficiently large openings in the veins, the presence of free fluid fat in the neighbourhood of these open veins, and a sufficient *vis à tergo* (generally an extravasation of blood), and that these conditions most frequently occurred in fractures of bones, less frequently in injuries of the soft parts and after amputations or excisions.

In a recent monograph on this subject (*Untersuchungen über die Fettembolie*) Scriba has discussed the whole question at great length, and has brought forward many valuable facts. In order to obtain a pure fatty embolism, apart from any septic infection, he boils oil before injecting it, and uses various precautions in its introduction into the circulation. He first inquires into the fate of fat injected into the veins, and, with the view of determining this, he introduces the oil into the bloodvessels of frogs, while he at the same time examines with the microscope the circulation in the lungs, tongue, etc. He has also tested the urine of patients who had suffered injuries to their bones. As the result of numerous experiments, he finds that fluid fat when introduced into the circulation is caught in greatest part in the capillaries of the lungs, forming emboli. A smaller portion passes on into the general circulation, and either forms emboli in various organs, or is excreted by the glomeruli of the kidney, and appears in the urine. In man, the emboli in the lungs become detached in about eight days, pass on into the general circulation, and in part form emboli in other organs, in part are excreted by the kidneys, while at the same time the emboli in the various organs become loosened, and may be caught in the lungs. This cycle may be repeated several times. The greatest part of the fat is excreted by the kidneys, only a small portion remaining behind in the body. In support of these views, he finds that, as a rule, after fractures, oil only appears at intervals in the urine. Thus, at first, it is found on the second, third, and fourth days; then it disappears, reappearing again from the tenth to the fourteenth day, and again for a third or fourth time, at intervals of six to ten days.

Fat, however, cannot be looked on as an indifferent substance; not only does it act mechanically, it also probably acts chemically. For it has been found that, when oil is shaken up with blood, the red blood-corpuscles are in great part destroyed, some fragments only of them being found, while hæmoglobin appears in considerable quantities in the fluid. And in like manner, when the urine is examined in cases of fatty embolism, blood-pigment is often found, and, where casts are present, these contain it in a granular form. According to some, fat exercises a directly deleterious effect on the heart; Scriba, however, does not admit this, but, on the contrary, holds that the cardiac disturbances which occur after injection of oil are solely due to the altered conditions of the circulation, from blocking of the pulmonary capillaries.

Scriba has further investigated the changes produced in the lungs by the fatty embola. Oil was injected into the veins, into the medulla of the bones, and into the abdominal cavity of rabbits, and in all instances the pulmonary vessels were found to contain numerous fatty emboli. In performing these experiments, it was observed that rapid injection of the oil is more fatal than a slow injection. When injected into a vein close to the heart, an amount of oil which, introduced under high pressure, would cause immediate death, if injected slowly produces scarcely recognizable effects. The fatty emboli are bland, and are not, as Wagner supposed, causes of pyæmia or secondary abscesses. The fat does not pass through the walls of the capillaries, but the plug becomes loosened and carried on in the general circulation, as formerly described.

With regard to the quantity of fat required to kill an animal, he comes to the conclusion that varying amounts will be necessary, according to the *vis à tergo* and the distance of the point of entrance of the fat into the circulation from the heart. If the *vis à tergo* be but little or if the distance be great, so that the increased blood-pressure produced by the entrance of the fat is equalized before it reaches the heart, a healthy animal requires a very large quantity of fat to kill it. The shorter the road, and the greater the *vis à tergo*, the less is the quantity of fat required; but in no case does Scriba think that less than three times the amount of fat present in the femur of the animal would be able to cause death. On examining the animals which died of fatty embolism, it was found that the vessels of the brain were very markedly blocked with fat; while, when these emboli were absent, or only present in small numbers, death did not occur, even although the lungs were full of them. In no case did he find death occur from acute œdema of the lungs. He therefore concludes that, in pure fatty embolism, death occurs only in consequence of extensive embolism of the vessels of the brain and spinal cord, and is due to the arterial anæmia and consequent disturbances of nutrition produced by the emboli.

He gives the following as the characteristic symptoms of fatty embolism: presence of fat in the urine at intervals; transient attacks of dyspnœa; lowering of temperature; temporary slight hæmoptysis, without fever, and generally without dulness or *râles;* irregular action of the heart; collapse, with marked pallor of the skin and mucous membranes; at first, shallow respiration, at times interrupted by deep sighing inspiration, later Cheyne-Stokes's respiration; spasms of various kinds or paralyses, generally bilateral; diminution of reflex irritability.

Such are some of the chief facts made out by Scriba with regard to the phenomena of fatty embolism. The subject is certainly one of the greatest importance, and calls for further investigation. It is, indeed, strange that, in spite of the interest which it has excited abroad, it should have attracted but little attention in this country.—*British Med. Journal*, May 22, 1880.

Starvation Fever.

At a late meeting of the College of Physicians of Philadelphia Dr. J. M. DA COSTA reported three cases, occurring in the same family, of what he proposes to call "Starvation Fever."

The first case was a little girl, three years of age, pale, weakly, and irritable, who was seized, Jan. 1, with vomiting. She was very feeble, unable to sit up in bed, and complaining of giddiness. The next day the same symptoms persisted, and the pulse was small and very rapid. Subsequently there was marked fever, and the vomiting lessened; under quinia, beef-tea, brandy, and milk, the gastric symptoms disappeared. The fever was unattended with sore throat, eruption, or diarrhœa, was not of long duration, and by the ninth day from the beginning of the attack, the little patient, in good spirits, with appetite fully returned, was sitting up in bed playing, seemingly quite convalescent. On the 10th, vomiting returned; henceforth nothing was retained on the stomach; the child complained